Release notes for ENDF/B Development n-036_Kr_082 evaluation

April 26, 2017

- **checkr** Warnings:

  1. A previous error halted parsing of the current section
     MAT=3637, MF= 1, MT=451 (1): Parsing stopped

     ```
     ERROR(S) FOUND IN MAT=3637, MF= 1, MT=451
          SECTION CANNOT BE CHECKED FROM SEQUENCE NUMBER     246 TO     300
     ```

- **checkr** Errors:

  1. A variable is outside the allowed ENDF range
     MAT=3637, MF= 1, MT=451 (0): Variable range

     ```
     ERROR(S) FOUND IN MAT=3637, MF= 1, MT=451
          MOD =    1 OUT OF RANGE    0 -    0          RECORD NUMBER    246
     ```

  2. Missing a section in directory so your directory is messed up. This error will break everything else
     MAT=3637, MF= 2, MT=151 (0): Directory (b)

     ```
     ERROR(S) FOUND IN MAT=3637, MF= 2, MT=151
          SECTION  2/151 NOT IN DIRECTORY             RECORD NUMBER    302
     ```

  3. Missing a section in directory so your directory is messed up. This error will break everything else
     MAT=3637, MF= 3, MT= 1 (0): Directory (b)

     ```
     ERROR(S) FOUND IN MAT=3637, MF= 3, MT=  1
          SECTION  3/  1 NOT IN DIRECTORY             RECORD NUMBER    446
     ```

  4. Missing a section in directory so your directory is messed up. This error will break everything else
     MAT=3637, MF= 3, MT= 2 (0): Directory (b)

     ```
     ERROR(S) FOUND IN MAT=3637, MF= 3, MT=  2
          SECTION  3/  2 NOT IN DIRECTORY             RECORD NUMBER    474
     ```

  5. Missing a section in directory so your directory is messed up. This error will break everything else
     MAT=3637, MF= 3, MT= 4 (0): Directory (b)

     ```
     ERROR(S) FOUND IN MAT=3637, MF= 3, MT=  4
          SECTION  3/  4 NOT IN DIRECTORY             RECORD NUMBER    502
     ```

  6. Missing a section in directory so your directory is messed up. This error will break everything else
     MAT=3637, MF= 3, MT= 16 (0): Directory (b)

     ```
     ERROR(S) FOUND IN MAT=3637, MF= 3, MT= 16
          SECTION  3/ 16 NOT IN DIRECTORY             RECORD NUMBER    518
     ```

  7. Missing a section in directory so your directory is messed up. This error will break everything else
     MAT=3637, MF= 3, MT= 17 (0): Directory (b)

1

```
ERROR(S) FOUND IN MAT=3637, MF= 3, MT= 17
    SECTION  3/ 17 NOT IN DIRECTORY              RECORD NUMBER    527
```

8. Missing a section in directory so your directory is messed up. This error will break everything else
   MAT=3637, MF= 3, MT= 22 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=3637, MF= 3, MT= 22
    SECTION  3/ 22 NOT IN DIRECTORY              RECORD NUMBER    532
```

9. Missing a section in directory so your directory is messed up. This error will break everything else
   MAT=3637, MF= 3, MT= 28 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=3637, MF= 3, MT= 28
    SECTION  3/ 28 NOT IN DIRECTORY              RECORD NUMBER    545
```

10. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=3637, MF= 3, MT= 51 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=3637, MF= 3, MT= 51
    SECTION  3/ 51 NOT IN DIRECTORY              RECORD NUMBER    555
```

11. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=3637, MF= 3, MT= 52 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=3637, MF= 3, MT= 52
    SECTION  3/ 52 NOT IN DIRECTORY              RECORD NUMBER    571
```

12. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=3637, MF= 3, MT= 53 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=3637, MF= 3, MT= 53
    SECTION  3/ 53 NOT IN DIRECTORY              RECORD NUMBER    586
```

13. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=3637, MF= 3, MT= 54 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=3637, MF= 3, MT= 54
    SECTION  3/ 54 NOT IN DIRECTORY              RECORD NUMBER    600
```

14. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=3637, MF= 3, MT= 55 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=3637, MF= 3, MT= 55
    SECTION  3/ 55 NOT IN DIRECTORY              RECORD NUMBER    613
```

15. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=3637, MF= 3, MT= 56 (0): Directory (b)

```
        ERROR(S) FOUND IN MAT=3637, MF= 3, MT= 56
          SECTION  3/ 56 NOT IN DIRECTORY                    RECORD NUMBER     626
```

16. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=3637, MF= 3, MT= 57 (0): Directory (b)

```
        ERROR(S) FOUND IN MAT=3637, MF= 3, MT= 57
          SECTION  3/ 57 NOT IN DIRECTORY                    RECORD NUMBER     638
```

17. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=3637, MF= 3, MT= 58 (0): Directory (b)

```
        ERROR(S) FOUND IN MAT=3637, MF= 3, MT= 58
          SECTION  3/ 58 NOT IN DIRECTORY                    RECORD NUMBER     650
```

18. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=3637, MF= 3, MT= 59 (0): Directory (b)

```
        ERROR(S) FOUND IN MAT=3637, MF= 3, MT= 59
          SECTION  3/ 59 NOT IN DIRECTORY                    RECORD NUMBER     662
```

19. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=3637, MF= 3, MT= 60 (0): Directory (b)

```
        ERROR(S) FOUND IN MAT=3637, MF= 3, MT= 60
          SECTION  3/ 60 NOT IN DIRECTORY                    RECORD NUMBER     673
```

20. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=3637, MF= 3, MT= 61 (0): Directory (b)

```
        ERROR(S) FOUND IN MAT=3637, MF= 3, MT= 61
          SECTION  3/ 61 NOT IN DIRECTORY                    RECORD NUMBER     684
```

21. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=3637, MF= 3, MT= 62 (0): Directory (b)

```
        ERROR(S) FOUND IN MAT=3637, MF= 3, MT= 62
          SECTION  3/ 62 NOT IN DIRECTORY                    RECORD NUMBER     695
```

22. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=3637, MF= 3, MT= 63 (0): Directory (b)

```
        ERROR(S) FOUND IN MAT=3637, MF= 3, MT= 63
          SECTION  3/ 63 NOT IN DIRECTORY                    RECORD NUMBER     705
```

23. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=3637, MF= 3, MT= 64 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=3637, MF= 3, MT= 64
     SECTION  3/ 64 NOT IN DIRECTORY                RECORD NUMBER      715
```

24. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=3637, MF= 3, MT= 91 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=3637, MF= 3, MT= 91
     SECTION  3/ 91 NOT IN DIRECTORY                RECORD NUMBER      725
```

25. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=3637, MF= 3, MT=102 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=3637, MF= 3, MT=102
     SECTION  3/102 NOT IN DIRECTORY                RECORD NUMBER      734
```

26. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=3637, MF= 3, MT=103 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=3637, MF= 3, MT=103
     SECTION  3/103 NOT IN DIRECTORY                RECORD NUMBER      757
```

27. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=3637, MF= 3, MT=104 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=3637, MF= 3, MT=104
     SECTION  3/104 NOT IN DIRECTORY                RECORD NUMBER      771
```

28. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=3637, MF= 3, MT=105 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=3637, MF= 3, MT=105
     SECTION  3/105 NOT IN DIRECTORY                RECORD NUMBER      783
```

29. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=3637, MF= 3, MT=107 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=3637, MF= 3, MT=107
     SECTION  3/107 NOT IN DIRECTORY                RECORD NUMBER      792
```

30. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=3637, MF= 4, MT= 2 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=3637, MF= 4, MT=  2
     SECTION  4/  2 NOT IN DIRECTORY                RECORD NUMBER      809
```

31. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=3637, MF= 4, MT= 16 (0): Directory (b)

4

```
ERROR(S) FOUND IN MAT=3637, MF= 4, MT= 16
    SECTION  4/ 16 NOT IN DIRECTORY              RECORD NUMBER     991
```

32. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=3637, MF= 4, MT= 17 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=3637, MF= 4, MT= 17
    SECTION  4/ 17 NOT IN DIRECTORY              RECORD NUMBER    1002
```

33. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=3637, MF= 4, MT= 22 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=3637, MF= 4, MT= 22
    SECTION  4/ 22 NOT IN DIRECTORY              RECORD NUMBER    1013
```

34. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=3637, MF= 4, MT= 28 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=3637, MF= 4, MT= 28
    SECTION  4/ 28 NOT IN DIRECTORY              RECORD NUMBER    1024
```

35. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=3637, MF= 4, MT= 51 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=3637, MF= 4, MT= 51
    SECTION  4/ 51 NOT IN DIRECTORY              RECORD NUMBER    1035
```

36. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=3637, MF= 4, MT= 52 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=3637, MF= 4, MT= 52
    SECTION  4/ 52 NOT IN DIRECTORY              RECORD NUMBER    1060
```

37. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=3637, MF= 4, MT= 53 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=3637, MF= 4, MT= 53
    SECTION  4/ 53 NOT IN DIRECTORY              RECORD NUMBER    1083
```

38. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=3637, MF= 4, MT= 54 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=3637, MF= 4, MT= 54
    SECTION  4/ 54 NOT IN DIRECTORY              RECORD NUMBER    1106
```

39. Missing a section in directory so your directory is messed up. This error will break everything else
    MAT=3637, MF= 4, MT= 55 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=3637, MF= 4, MT= 55
    SECTION  4/ 55 NOT IN DIRECTORY                 RECORD NUMBER    1129
```

40. Missing a section in directory so your directory is messed up. This error will break everything else
   MAT=3637, MF= 4, MT= 56 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=3637, MF= 4, MT= 56
    SECTION  4/ 56 NOT IN DIRECTORY                 RECORD NUMBER    1152
```

41. Missing a section in directory so your directory is messed up. This error will break everything else
   MAT=3637, MF= 4, MT= 57 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=3637, MF= 4, MT= 57
    SECTION  4/ 57 NOT IN DIRECTORY                 RECORD NUMBER    1175
```

42. Missing a section in directory so your directory is messed up. This error will break everything else
   MAT=3637, MF= 4, MT= 58 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=3637, MF= 4, MT= 58
    SECTION  4/ 58 NOT IN DIRECTORY                 RECORD NUMBER    1198
```

43. Missing a section in directory so your directory is messed up. This error will break everything else
   MAT=3637, MF= 4, MT= 59 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=3637, MF= 4, MT= 59
    SECTION  4/ 59 NOT IN DIRECTORY                 RECORD NUMBER    1221
```

44. Missing a section in directory so your directory is messed up. This error will break everything else
   MAT=3637, MF= 4, MT= 60 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=3637, MF= 4, MT= 60
    SECTION  4/ 60 NOT IN DIRECTORY                 RECORD NUMBER    1244
```

45. Missing a section in directory so your directory is messed up. This error will break everything else
   MAT=3637, MF= 4, MT= 61 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=3637, MF= 4, MT= 61
    SECTION  4/ 61 NOT IN DIRECTORY                 RECORD NUMBER    1267
```

46. Missing a section in directory so your directory is messed up. This error will break everything else
   MAT=3637, MF= 4, MT= 62 (0): Directory (b)

```
ERROR(S) FOUND IN MAT=3637, MF= 4, MT= 62
    SECTION  4/ 62 NOT IN DIRECTORY                 RECORD NUMBER    1290
```

47. Missing a section in directory so your directory is messed up. This error will break everything else
   MAT=3637, MF= 4, MT= 63 (0): Directory (b)

```
      ERROR(S) FOUND IN MAT=3637, MF= 4, MT= 63
         SECTION  4/ 63 NOT IN DIRECTORY                  RECORD NUMBER    1313
```

48. Missing a section in directory so your directory is messed up. This error will break everything else
   MAT=3637, MF= 4, MT= 64 (0): Directory (b)

```
      ERROR(S) FOUND IN MAT=3637, MF= 4, MT= 64
         SECTION  4/ 64 NOT IN DIRECTORY                  RECORD NUMBER    1336
```

49. Missing a section in directory so your directory is messed up. This error will break everything else
   MAT=3637, MF= 4, MT= 91 (0): Directory (b)

```
      ERROR(S) FOUND IN MAT=3637, MF= 4, MT= 91
         SECTION  4/ 91 NOT IN DIRECTORY                  RECORD NUMBER    1359
```

50. Missing a section in directory so your directory is messed up. This error will break everything else
   MAT=3637, MF= 5, MT= 16 (0): Directory (b)

```
      ERROR(S) FOUND IN MAT=3637, MF= 5, MT= 16
         SECTION  5/ 16 NOT IN DIRECTORY                  RECORD NUMBER    1383
```

51. Missing a section in directory so your directory is messed up. This error will break everything else
   MAT=3637, MF= 5, MT= 17 (0): Directory (b)

```
      ERROR(S) FOUND IN MAT=3637, MF= 5, MT= 17
         SECTION  5/ 17 NOT IN DIRECTORY                  RECORD NUMBER    1431
```

52. Missing a section in directory so your directory is messed up. This error will break everything else
   MAT=3637, MF= 5, MT= 22 (0): Directory (b)

```
      ERROR(S) FOUND IN MAT=3637, MF= 5, MT= 22
         SECTION  5/ 22 NOT IN DIRECTORY                  RECORD NUMBER    1446
```

53. Missing a section in directory so your directory is messed up. This error will break everything else
   MAT=3637, MF= 5, MT= 28 (0): Directory (b)

```
      ERROR(S) FOUND IN MAT=3637, MF= 5, MT= 28
         SECTION  5/ 28 NOT IN DIRECTORY                  RECORD NUMBER    1588
```

54. Missing a section in directory so your directory is messed up. This error will break everything else
   MAT=3637, MF= 5, MT= 91 (0): Directory (b)

```
      ERROR(S) FOUND IN MAT=3637, MF= 5, MT= 91
         SECTION  5/ 91 NOT IN DIRECTORY                  RECORD NUMBER    1665
```

- `psyche` Warnings:

1. Strength function in URR not in agreement with PSYCHE's expectations
   FILE 2 / SECTION 151 / ISOTOPE MASS = 82. L = 0 / STRENGTH FUNCTION IS 1.96974E-02 / STRENGTH FUNCTION 1.96974E-02 / LIES OUTSIDE LIMITS 1.00000E-05 TO 1.00000E-04 (0): URR str. ftn.

   ```
   FILE  2
      SECTION 151
           ISOTOPE MASS =  82. L =  0
                     STRENGTH FUNCTION IS  1.96974E-02
                                   STRENGTH FUNCTION 1.96974E-02
   ... [1 more lines]
   ```

2. Non-threshold reaction with Q value differing from PSYCHE's expectations
   FILE 3 / SECTION 107 / THE CALCULATED Q 8.89334E+05 DISSAGREES WITH THE GIVEN Q 9.83812E+05 (0): Iffy Q

   ```
   FILE  3
      SECTION 107
              THE CALCULATED Q  8.89334E+05 DISSAGREES WITH THE GIVEN Q  9.83812E+05
   ```

- `fudge-4.0` Warnings:

   1. Missing a channel with a particular angular momenta combination
      resonances / resolved / MultiLevel_BreitWigner (Error # 0): missingResonanceChannel

      ```
      WARNING: Missing a channel with angular momenta combination L = 0, J = 1.5 and S = 1.5 for "capture"
      ```

   2. Potential scattering hasn't converged, you need more L's!
      resonances / resolved (Error # 1): potentialScatteringNotConverged

      ```
      WARNING: Potential scattering hasn't converged by L=0 at E=40.0 eV, xs[0]/xs[0]=100.0% > 0.1%
      ```

   3. The URR for this spin group needs higher energy resolution for correct representation of the average cross section
      resonances / unresolved (Error # 0): URRinsufficientEnergyGrid

      ```
      WARNING: More points needed in L=0 J=0.5 unresolved widths between 40. eV and 4.e2 eV
      WARNING: More points needed in L=1 J=0.5 unresolved widths between 40. eV and 4.e2 eV
      WARNING: More points needed in L=1 J=1.5 unresolved widths between 40. eV and 4.e2 eV
      WARNING: More points needed in L=2 J=1.5 unresolved widths between 40. eV and 4.e2 eV
              ... plus 1 more instances of this message
      ```

   4. Cross section does not match sum of linked reaction cross sections
      crossSectionSum label 0: total (Error # 0): CS Sum.

      ```
      WARNING: Cross section does not match sum of linked reaction cross sections! Max diff: 0.20%
      ```

- `fudge-4.0` Errors:

   1. Calculated and tabulated Q values disagree.
      reaction label 16: n[multiplicity:'2'] + Kr81 (Error # 0): Q mismatch

      ```
      WARNING: Calculated and tabulated Q-values disagree: -10973797.6774292 eV vs -1.09601e7 eV!
      ```

2. Calculated and tabulated Q values disagree.
reaction label 20: n + He4 + Se78 (Error # 0): Q mismatch

```
WARNING: Calculated and tabulated Q-values disagree: -5995347.085235596 eV vs -5981380. eV!
```

3. Calculated and tabulated Q values disagree.
reaction label 22: H2 + Br81_s (Error # 0): Q mismatch

```
WARNING: Calculated and tabulated Q-values disagree: -7686084.194274902 eV vs -7598510. eV!
```

4. Calculated and tabulated Q values disagree.
reaction label 23: H3 + Br80_s (Error # 0): Q mismatch

```
WARNING: Calculated and tabulated Q-values disagree: -11585535.14541626 eV vs -1.15745e7 eV!
```

5. Calculated and tabulated Q values disagree.
reaction label 24: He4 + Se79_s (Error # 0): Q mismatch

```
WARNING: Calculated and tabulated Q-values disagree: 967484.976348877 eV vs 983812. eV!
```

- `njoy2012` Warnings:

  1. With the advent of the ENDF-6 format, it is possible to make evaluations that fully describe all the products of a nuclear reaction. Some carry-over evaluations from earlier ENDF/B versions also have this capability, but many do not. This message is intended to goad evaluators to improve things!
  groupr...compute self-shielded group-averaged cross-sections (0): GROUPR/conver (0)

     ```
     ---message from conver---cannot do complete particle production for mt= 16
                       only mf4/mf5 provided
     ```

  2. With the advent of the ENDF-6 format, it is possible to make evaluations that fully describe all the products of a nuclear reaction. Some carry-over evaluations from earlier ENDF/B versions also have this capability, but many do not. This message is intended to goad evaluators to improve things!
  groupr...compute self-shielded group-averaged cross-sections (1): GROUPR/conver (0)

     ```
     ---message from conver---cannot do complete particle production for mt= 17
                       only mf4/mf5 provided
     ```

  3. With the advent of the ENDF-6 format, it is possible to make evaluations that fully describe all the products of a nuclear reaction. Some carry-over evaluations from earlier ENDF/B versions also have this capability, but many do not. This message is intended to goad evaluators to improve things!
  groupr...compute self-shielded group-averaged cross-sections (2): GROUPR/conver (0)

     ```
     ---message from conver---cannot do complete particle production for mt= 22
                       only mf4/mf5 provided
     ```

  4. With the advent of the ENDF-6 format, it is possible to make evaluations that fully describe all the products of a nuclear reaction. Some carry-over evaluations from earlier ENDF/B versions also have this capability, but many do not. This message is intended to goad evaluators to improve things!
  groupr...compute self-shielded group-averaged cross-sections (3): GROUPR/conver (0)

```
---message from conver---cannot do complete particle production for mt= 28
                        only mf4/mf5 provided
```

5. With the advent of the ENDF-6 format, it is possible to make evaluations that fully describe all the products of a nuclear reaction. Some carry-over evaluations from earlier ENDF/B versions also have this capability, but many do not. This message is intended to goad evaluators to improve things!
   groupr...compute self-shielded group-averaged cross-sections (4): GROUPR/conver (0)

```
---message from conver---cannot do complete particle production for mt= 91
                        only mf4/mf5 provided
```